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AUTHOR Winans, Glen T.
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ABSTRACT

Different approaches employed to automate the administrative recordkeeping processes within academic departments at three University of California campuses are contrasted: the University of California at Berkeley, the University of California at Los Angeles, and the University of California at Santa Barbara. The results are based on campus visitations and interviews with staff involved in developing and using automated recordkeeping systems for academic departments. These campuses shared a mutual goal of enhancing departmental administrative performance through automation, although there was considerable variation in the actual systems implemented. Eight common factors that influenced departmental systems development at each institution are considered in order of importance, based on the frequency they were mentioned by campus personnel: (1) awareness of departmental needs, (2) decentralization of fiscal responsibility, (3) availability of resources, (4) growth of computer literacy, (5) predisposition to computing, (6) management of contracts and grants, (7) philosophy of internal organization, and (8) legacy of past failures. Included are practical recommendations based on the collective experiences of the three campuses. (SW)

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AUTOMATING ACADEMIC DEPARTMENTS - CONTRASTING APPROACHES FROM THREE PUBLIC RESEARCH UNIVERSITIES

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By:

Glen T. Winans
Assistant Provost
College of Letters and Science
University of California
Santa Barbara, CA 93117
(805) 961-3405

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THE ASSOCIATION FOR INSTITUTIONAL RESEARCH

This paper was presented at the Twenty-Fifth Annual Forum of the Association for Institutional Research held at the Portland Hilton in Portland, Oregon, April 28-May 1, 1985. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum papers.

Elizabeth F. Fox, Chair
Forum Publications Editorial
Advisory Committee

ABSTRACT

Comparative review of the contrasting approaches of three campuses within the University of California in automating the administrative recordkeeping processes within academic departments. The three campuses shared a mutual goal of enhancing departmental administrative performance through automation, although there was considerable variation in the actual systems implemented. Included is an empirical analysis of eight common factors which influenced departmental systems development at each institution, as well as some practical recommendations based on the collective experiences of the three campuses. The results are based on campus visitations and interviews with staff involved in developing and using automated recordkeeping systems for academic departments.

INTRODUCTION

The purpose of this paper is to present a comparative empirical analysis of how three public doctoral-granting research universities are attempting to automate the administrative recordkeeping functions within academic departments. The emphasis is on a heuristic evaluation of the process each institution followed in striving to enhance departmental administrative performance through increased computerization.

The three institutions included in this study are all campuses within the University of California system: the University of California at Berkeley (UCB), the University of California at Los Angeles (UCLA), and the University of California at Santa Barbara (UCSB). Over the past three years, each campus has independently engaged in the process of automating the administrative recordkeeping functions of academic departments, with considerable variation in the actual operating systems implemented. In this paper, administrative recordkeeping is defined as those processes by which a department plans, manages, and controls its financial resources within the policies and procedures of the University of California.

Despite differences in the proposed solutions, each campus faced similar problems with departmental financial administration and sought to automate recordkeeping in order to support instruction and research programs more effectively at the operating unit level. This paper will profile the department systems adopted for each of the three UC campuses, review the

primary factors which influenced development of the systems, and provide several practical recommendations based on the findings.

RESEARCH DESIGN

The descriptive empirical results presented in this study are based upon three primary data sources: 1) in-person interviews, 2) on-site observations, and 3) review of pertinent reports and documents. The author has been involved in the development of departmental resource management systems at UCSB, and conducted campus visitations to UCB and UCLA to collect comparative data. Interviews were conducted at all three institutions with department staff and central administrative staff who have participated in the planning and development of automated recordkeeping systems. Selection of respondents was not random since the number of key individuals directly involved in departmental systems development is limited.

The review of each campus focused on the process by which the system was developed. The predominant theme was to determine what factors influence the development of automated recordkeeping systems for academic departments, and to compare and contrast these factors. These findings are also intended to offer some insights of practical value to other institutions.

The research did not entail a comprehensive review of the available literature for two reasons. First, the study is a descriptive account of how three campuses within the University

of California responded to the need for improved financial management at the department level. Second, the overwhelming majority of literature in the broad area of financial management in higher education does not effectively address department level issues, but instead focuses on macro comparisons between institutions and systems. Therefore, this research will contribute to the literature by summarizing the experience of three public research universities undertaking the task of automating departmental administrative recordkeeping.

PROFILES OF CAMPUS SYSTEMS

University of California at Berkeley

The system developed at UCB is referred to as the Berkeley Encumbrance Accounting Recordkeeping System (BEARS) for academic departments and research units. The present version of BEARS consists of a multi-user or single-user department accounting system operating on the central campus IBM 3081 mainframe computer using Televideo Model 925 terminals and a Develcon Model 9509A Line Driver located in the user department. The system was written in FOCUS under CMS and features thirty-two standard reports for users.

BEARS was designed jointly by the campus Information Systems Office and the College of Chemistry. Initial development took place over a ten month period from March 1983 through December 1983 following a six month study of departmental accounting needs within the College of Chemistry. The study results indicated

that academic departments needed greater control over recording and reporting financial data since the central campus general ledger system was inflexible, untimely, and inaccurate.

BEARS provides departments with the ability to maintain interactive real-time financial records for all general fund and extramural contract and grant expenditures. The system features flexible reporting tailored to departmental needs and schedules including unique cost centers and object and vendor codes. BEARS is designed for automatic monthly reconciliation to the campus general ledger and allows for transfer of detail or summary level data to LOTUS 1-2-3 for projection and analysis purposes.

By the close of the 1984/85 academic year, BEARS will be installed in eight departments or units at UCB: Anatomy and Physiology, Business Administration, Chemistry, Electrical Engineering and Computer Science, Institute of Governmental Studies, Institute of Transportation Studies, Molecular Biology, and Organized Research Services.

Future development efforts for BEARS include a departmental Payroll/Personnel Subsystem for tracking all payroll related data and preparing all required payroll documentation, plus installation of the current Departmental Accounting Subsystem of BEARS in stand-alone mode using PC FOCUS and either the IBM PC/XT or IBM PC/AT.

University of California at Los Angeles

The system under development at UCLA is referred to as the Campus Financial System (CFS) and is envisioned eventually to

integrate all components of financial reporting into a single shared data base operating in real-time mode on the central campus IBM 3081 mainframe computer. This integrated systems model is to include a Departmental Accounting Module operating on an IBM PC/AT beginning in two pilot academic departments in 1985/86. The central and departmental portions of CFS will both be written in COBOL.

CFS is being developed by the campus Administrative Information Systems Office working under the direction of a Financial Systems Work Group reporting to an Executive Management Group. The Financial Systems Work Group includes representatives from various constituencies throughout the campus and has been responsible for development of an overall long range plan for automating financial management at UCLA.

Actual development work on CFS began in 1982 with the purchase of a pre-packaged general ledger software system to replace the campus ledger and provide more extensive management information reporting capabilities. This led to the creation of an expanded account code structure for the campus and recognition of the need to a) convert all financial feeder systems to a common chart of accounts, and b) develop more timely and accurate recordkeeping for departments. The campus also adopted a long term goal of enhancing departmental financial management by allowing for daily data entry and updating of all transactions with interactive access to the data, thus eliminating the need for separate or dual department records.

The departmental portion of the system to be developed and

installed in two academic departments, Microbiology and the Graduate School of Management, will be implemented over a three year period beginning in July 1985. The system will initially feature a Departmental Accounting Module to facilitate real-time bookkeeping of general fund and extramural contract and grant expenditures by department staff. Eventually, departments will receive downloaded detail data from the central CFS on a daily basis, relieving departments of the need to re-enter most fiscal transactions in their local systems. This downloaded data will include all necessary transaction information from campus feeder systems in consistent account structure format.

University of California at Santa Barbara

The system developed at UCSB is referred to as the Automated Recordkeeping System (ARCS) for academic departments and research units. The present version of ARCS consists of an Accounting Module operating in stand-alone mode on an IBM PC/XT using DOS 2.1 and 640K internal memory. The Accounting Module features fifty-four programs written in PC FOCUS which yield nineteen data entry screens and twenty-one standard reports for users.

The system was designed by an external consulting firm, BLA Consulting, Inc., under the direction of a Development Team reporting to the Provost of the College of Letters and Science. Development of the initial Accounting Module of ARCS took place over a nine month period from September 1983 through June 1984, and was based on the results of a departmental needs analysis study conducted by the consultants in the spring of 1983. The

study revealed a critical need to improve departmental financial management capabilities and recommended development of a decentralized stand-alone departmental recordkeeping system as a low-cost method for overcoming the problems of a) inaccurate and untimely data, b) the absence of encumbrance accounting or budgetary projection capabilities, and c) excessive reliance upon manual processing and posting of data by department staff.

The Accounting Module of ARCS features an interactive real-time system which provides for daily posting of appropriations, liens, and expenditures and more flexible reporting than otherwise available from central campus financial systems. ARCS includes cost centers, sub-accounts, and cost types assigned and controlled by the department to facilitate tracking of general fund and extramural contract and grant costs, and is designed for monthly reconciliation with the campus general ledger.

By the close of the 1984/85 academic year, the Accounting Module will be installed in twenty-two departments or units at UCSB (sixteen inside the College of Letters and Science and six outside the College): Anthropology, Arts and Lectures, Biological Sciences, Chemistry, Dramatic Art, Economics, English, Environmental Studies, Geography, Geological Sciences, Graduate Division, Institute of Environmental Stress, Marine Science Institute, Mathematics, Music, Physics, Provost's Office, Psychology, School of Education, Sociology, Student Health Center, and Vivarium.

Development is also underway to expand the ARCS system beginning in 1985/86 to include a Budget Forecasting Module to

assist in preparation of grant proposals and instructional budget requests, and a Storeroom Inventory Control Module to service the needs of laboratory science departments. Plans call for eventual implementation of a local area network in large departments to allow for multi-user access to each of the modules.

FACTORS INFLUENCING SYSTEMS DEVELOPMENT

Although UCB, UCLA, and UCSB independently developed new departmental recordkeeping systems, many of the factors influencing the decision to create either BEARS, CFS, or ARCS were similar. The relative priority of a given factor varied from campus to campus, but the collective impact of the combined factors was generally the same at each institution. Interestingly, separate campus systems were developed based on perceived institution specific differences despite considerable similarity in the conditions motivating the campuses to action.

Discussed below are the eight primary factors which influenced the development of automated recordkeeping systems for academic departments. The factors are listed in order of importance based on the frequency of which they were mentioned by campus personnel.

Awareness of Departmental Needs

Increasing awareness of departmental needs for improved financial management information was a major factor at all three campuses. Since existing central campus ledger systems were

inaccurate, untimely, and inflexible, departments were forced to maintain manual records in an attempt to manage resources properly. The need to monitor transactions in a real-time mode and to record detailed transactions in accordance with departmental organization revealed that departmental financial thinking does not begin with the general ledger, but rather, ends with it. Departments viewed the central ledger merely as a monthly financial summary report to be verified and reconciled, and the ability of the central administration to finally recognize this fact was of paramount importance.

Decentralization of Fiscal Responsibility

Decentralization of financial management responsibility has been an on-going phenomena in the University of California since the 1970s when the systemwide administration delegated to each campus responsibility for maintaining its own financial management system. This break-up of centralized or corporate control ultimately had ripple effects throughout the institution, leading to the emergence of a decentralized philosophy towards administrative computing in which users could influence systems development outcomes. It also led to an increasing role of Deans and Department Chairpersons in directly managing resources and in establishing priorities for administrative systems.

Availability of Resources

The availability of resources at each institution affected systems development in two ways. First, the period of limited resources and budgetary reductions in the late 1970s and early 1980s emphasized the critical need for effective departmental

resource management. The inability of many departments to respond to this challenge properly due to inadequate financial recordkeeping seriously impaired the administration of instructional and research programs. This absence of effective resource management at the department level provided a strong impetus for systems development. Second, limitations on available resources allowed all the campuses to accept a short-run philosophy of dual-entry bookkeeping, in which manual department accounting systems were simply automated to improve efficiency at the operating unit level. Although each campus plans to integrate financial systems to eliminate duplication, non-elegant solutions were acceptable because it was impossible to buy happiness for everyone at once.

Growth of Computer Literacy

The rapid growth in general computer literacy among faculty and students contributed to the decision to develop automated recordkeeping systems for academic departments. This was most evident in the proliferation of computing for instruction and research in many disciplines, as automation provides many tangible benefits to faculty and students engaged in both the discovery and dissemination of knowledge. At the same time, the departmental administrative services designed to support teaching and research remained remedial by comparison due to the absence of state-of-the-art computing. The gap between what faculty and students could accomplish in the laboratory or classroom and what staff could accomplish in the department office grew ever wider,

frustrating both faculty and staff. Thus, the potential for improved administrative processing capabilities due to automation ultimately mobilized departments to seek computerization.

Predisposition to Computing

The predisposition of each campus to particular computing alternatives is evident in the unanimous choice of IBM hardware at UCB, UCLA, and UCSB. The combination of a major gift program to the University of California by IBM and a substantial discount purchase program with IBM on mini-computers, micro-computers, printers, and word processing equipment basically dictated the systems solution for departmental recordkeeping. Concern with issues such as IBM compatibility, linking central and local systems, and the questionable suitability of scientific computing systems for administrative processing led each campus to use IBM equipment in administrative systems development. This decision reflected a tremendous institutional investment in IBM, a commitment to continue that investment in the future, and a willingness to wait for IBM to develop any peripherals or enhancements which might be available from other vendors.

Management of Contracts and Grants

Continued growth in extramural contract and grant activity by faculty was another factor influencing systems development. The need to administer an expanding number of contracts and grants coupled with increasing federal regulations and demands for accountability and reporting created enormous workload pressures in most departments. Staff from each campus agreed that the pressures for contract and grant accounting were far

more severe than those for general fund accounting.

Philosophy of Internal Organization

Each institution's philosophy of internal organization was a factor in determining control over the actual implementation of a departmental recordkeeping system. A combination of existing campus policies and procedures and administrative personalities influenced whether systems development was centralized or decentralized. UCB and UCSB adopted a bottom-up model, by placing control of systems design in the hands of department users and seeking to maximize returns from the system at that level. UCLA adopted a top-down model, by keeping control of systems design within the central administration while maintaining department user input and seeking to maximize returns at both levels.

Legacy of Past Failures

The development of automated recordkeeping systems for academic departments at each institution was also influenced by a legacy of past failures. UCB, UCLA, and UCSB had all attempted improvements in campus financial systems to serve departmental needs more effectively. However, these attempts were generally more process than substance, featuring plans that were never implemented and promises that were never kept. Although this created problems of credibility, it also fostered greater institutional determination to succeed in implementing new systems to enhance resource management by departments.

The eight factors common to UCB, UCLA, and UCSB created an environment or atmosphere that was primed for addressing the problems of departmental automation. In interviewing campus staff it became apparent that the interactive or collective influence of these factors was of far greater importance than the independent influence of a single factor. It is difficult to assess whether the absence of one or more of the factors would have precluded eventual systems development, or whether in fact automating administrative recordkeeping in academic departments was a compelling idea whose time had finally come.

CONCLUSIONS

The process of interviewing campus personnel and observing departmental systems development at UCB, UCLA, and UCSB yielded a number of valuable insights. In particular, the eight factors above represent the major influences impacting the automation of administrative recordkeeping within academic departments at these three campuses. However, there are several additional conclusions which can be drawn from this collective experience besides the obvious lessons in the previous discussion. These include six general observations discussed below.

The Campus Environment Must be Ready for Change

In any systems development effort aimed at improving administrative performance at the operating unit level, the general campus environment must be conducive to change. Besides the need for available resources and some consensus that

developing departmental systems are of sufficient priority to warrant expending those resources, the atmosphere on campus must be ripe for an upheaval of the old order. Some portion of the faculty and staff must be disgruntled enough to offset the turmoil caused by modifying the accepted way of doing things.

Institutions Develop Individualized Systems

Despite the best efforts of others, institutions will ultimately develop their own individualized systems to address institution specific needs. This parochial attitude is especially interesting since similar claims by departments for unique solutions based on disciplinary differences are generally disregarded in the basic systems development process.

Departmental Involvement is Essential

Not surprisingly, departmental involvement from the beginning to the end of the development process is essential to success. Academic departments are where the action is, and local control and user satisfaction are best achieved through direct participation in systems design and testing by faculty and staff. Any new system will arouse suspicion and apprehension which usually can be overcome through repeated interaction and gentle persuasion.

Non-Elegant Solutions Are Practical

Contrary to the generally accepted folklore concerning administrative systems, non-elegant computer solutions are exceedingly practical. It is far better, and probably less expensive, to initially implement systems which recognize the

reality of duplicative recordkeeping. This allows solutions which enhance resource management to reach more departments in a shorter period of time, thus avoiding other costs. Initial systems can also facilitate user acceptance and training since they do not attempt to buy happiness for everyone, but instead simply help departments by automating current manual operations.

Systems Development Takes Longer Than Expected

An important consideration to remember is that any systems development project will take longer than expected. Even with careful planning contingencies can surface daily, and each contingency requires renegotiation with departmental representatives. This negotiation process continues throughout systems implementation, as departments repeatedly seek enhancements after using the system. Moreover, the computer industry is so fluid that technological changes force design modifications before the system is even ready for implementation.

Systems Training and Maintenance is Expensive

Lastly, systems training and maintenance is often more expensive than anticipated because it is so labor intensive. Each new installation adds a multiplier effect to systems maintenance costs which are unaffected by economies of scale. Similarly, training becomes an on-going fixed cost as personnel are required to prepare and update manuals, orient new users and replacement staff, coordinate users groups, and monitor systems performance with an eye towards possible enhancements.

The experiences of UCB, UCLA, and UCSB in developing

computerized systems for administrative recordkeeping in academic departments illustrate contrasting approaches to a common set of resource management problems. Although the systems implemented are in various stages of completion and actual use, the factors influencing the development process and the observations or conclusions about that process are consistent from campus to campus. This relative similarity provides valuable perspective to other institutions contemplating improvements in administrative recordkeeping systems for academic departments.